

Patient Perceptions on Telehealth for Managing Healthcare Needs

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Abstract

Background: Current evidence supports telehealth as a promising approach to increasing access to care and improving patient outcomes. However, provider and patient perspectives on telehealth can influence engagement with interventions and may impact health behavior and clinical outcomes for better or worse. Prior studies have focused mainly on the views of healthcare providers (HCPs). More research is needed on patients' perspectives in order to better understand how their perceptions influence use of telehealth, subsequent health behaviors, and clinical outcomes. Therefore the purpose of this study was to explore patients' experiences, perspectives, and attitudes related to telehealth. The theoretical framework guiding this research posits that patient adherence to self-care activities is influenced by patient perceptions about participation in the healthcare encounter, self-efficacy, and understanding of healthcare provider recommendations. Telehealth interventions may reinforce these factors, thereby supporting improved adherence to self-care regimens and improved clinical outcomes.

Methods: Data for this study were collected from 16 attention control group participants enrolled within a larger study that tested an intervention for promoting lifestyle changes for cardiovascular disease risk factor reduction in adults with type 2 diabetes mellitus (T2DM). The intervention group received biweekly decision coaching based on self-selected health goals, while the attention control group received general healthcare information phone calls at the same interval. Telehealth was the topic of one of the healthcare information phone calls, and participants' self-reported experiences were written into case notes summarizing the key content of the dialog. Data were then coded for key themes and content-analyzed in relation to selected socio-demographic and clinical variables. Bivariate correlational statistics and chi-square tests of significance were used in the applicable contexts to explore associations among the variables.

Results: Four major topics emerged from dialog of participants during the phone calls: (1) types of telehealth services used, (2) reasons for using telehealth, (3) factors that facilitated telehealth use, and, (4) factors that were barriers to telehealth use. Three statistically significant relationships were found between clinical variables and telehealth perceptions. First, time (years) since diagnosis with T2DM was correlated with higher HbA1C levels at baseline ($r=0.51$, $p=0.04$), indicating lower T2DM control with longer time since diagnosis. Time since diagnosis with T2DM was also associated with a higher number of perceived facilitators of telehealth use ($r=0.58$, $p=0.02$). Finally, an increased number of reasons to use telehealth ($r=0.71$, $p=0.002$) and a higher number of perceived facilitators ($r=0.76$, $p=0.001$) were correlated with current telehealth use.

Discussion: For telehealth interventions to be successful, healthcare providers should understand what purposes, facilitators, and barriers are relevant to their patients. HCPs should also consider patients with complex medical conditions as potential candidates for telehealth interventions. This study contributes to an emerging body of research on patients' perceptions of telehealth. This new knowledge is a necessary basis to inform future research on the impact of telehealth in management of chronic health conditions such as T2DM.

Patient Perceptions on Telehealth in Chronic Disease Management

With communication technology becoming increasingly present in everyday life, its use in health care is expanding (Hein, 2009; Coye, Haselkorn, & DeMello, 2009). Telehealth is a broad term that refers to the use of information technology in health care. Telehealth encompasses multiple types of electronically-based software, hardware, and health care services, and is generally characterized by the transmission of health-related information through communication technologies such as telephone or the internet (Hein, 2009). Telehealth includes programs designed to improve the services of and communication between healthcare providers (HCPs), such as e-prescribing, distance education, and online medical journal databases. Another category of telehealth service supports enhanced communication between HCPs and patients, which is of particular interest in the management of chronic diseases such as diabetes, congestive heart failure, and even psychiatric illnesses such as depression. Provider-patient telehealth services are far-reaching and include telecommunication of appointment reminders or test results, electronic medical records available to both patient and provider online, video conferencing with distant specialists, mobile/smartphone applications for disease management or health promotion, and remote patient monitoring (RPM) of vital signs, daily weights, blood glucose levels, and other parameters of health and disease control.

Potential benefits to both patients and providers through the utilization of telehealth programs have only recently begun to be systematically studied. Telehealth has the potential for multiple benefits because it supports the preventative, health promotion, and curative aspects of health by its very nature. It has the capacity to increase access to care by reducing costs to insurers and users of health care services. When telehealth is used successfully, fewer in-person encounters may be needed to manage health care needs (Chase et al., 2003), which could theoretically lead to decreased transportation and healthcare costs to the client. Telehealth may permit those in remote areas to have access to specialized care, which they may not have had the resources to obtain otherwise (Innovations Exchange Team, 2013). Financial benefits to the health care institution may exist, as the market for telehealth services is expected to grow due to the increasing incidence of chronic diseases, the need to improve community health, the projected increase in United States population, and the shortage of healthcare professionals (Hein, 2009). A significant potential benefit of expanding the current telehealth infrastructure is improved patient outcomes. A variety of studies have shown an association between chronic disease management through RPM and decreased emergency room visits, hospital stays, and nursing home admissions (Hein, 2009; Maudlin, Keene, & Kobb, 2006). Another study of RPM in people with diabetes has shown promising results in terms of glycemic control (Chase et al., 2003). Existing research on patient perceptions of telehealth has revealed positive attitudes overall, and many users report an increased sense of knowledge and empowerment in managing their health (King et al., 2010; Minatodani et al., 2013; Pare et al., 2007; Maudlin et al., 2006).

Despite these studies of health and health system outcomes that document the potential public health impact of telehealth, a number of barriers to implementing telehealth on a wider scale are present. Infrastructure is currently inadequate to expand telehealth services to the entire population (Hein, 2009). For example, not every health

care practice has a system in place for private and secure telecommunication. In addition, the costs of the technology and training can be steep. One of the most prohibitive factors for providers is the lack of reimbursement for telehealth services, causing many to view implementation as an increase in workload without worthwhile compensation (Hein, 2009). Despite the fact that many studies have demonstrated positive patient attitudes toward telehealth, findings are mixed. Some patients have expressed reservations about telehealth and view it as a threat to their autonomy (Saunders et al., 2012). Furthermore, not all studies support that telehealth improves patient outcomes and is cost-effective (Takahashi et al., 2012).

In summary, telehealth shows significant promise as an intervention to improve healthcare and health care outcomes. However, as a relatively new facet of healthcare, more research is needed on the efficacy of telehealth and consumers' perceptions before providers and policymakers can be convinced of its benefits. The existing research has focused mainly on the perspectives of health care providers and policymakers, with comparatively less focus on the perceptions of health care consumers. **Therefore, the overall purpose of this thesis is to contribute to knowledge about how recipients of health care services perceive telehealth services.**

Review of Literature

Chronic Disease Management and Patient Outcomes

Telehealth holds great potential in the field of chronic disease management. A number of studies have demonstrated comparable or improved patient outcomes with telehealth interventions as compared to traditional in-person encounters, although research findings are mixed. A systematic review of telehealth by Pare et al. (2007) found that improved patient outcomes—as measured by decreased emergency department visits, hospital admissions, and average hospital length of stay—occurred in patients with cardiac or pulmonary disorders, but results were inconsistent among patients with diabetes or hypertension. In contrast, other research does support the efficacy of disease management programming and telehealth for improving outcomes in diabetes, a chronic disease that is associated with substantial excess health system costs and poor clinical outcomes (Centers for Disease Control and Prevention, 2014). For example, one retrospective cohort study of patients with diabetes enrolled in a telehealth management program revealed improved glycemic control as measured by decreased hemoglobin A1c (HbA1c) at three and six months (Kesavedev et al., 2012). Another study of patients with diabetes examined whether or not RPM of blood glucose levels could take the place of clinic visits and found that levels of glycemic control and acute diabetes complications were comparable between the telehealth group and the control group (Chase et al., 2003). A 2009 systematic review of home telehealth for diabetes management found that telehealth was comparable or favorable to in-person encounters as measured by glycemic control (HbA1c), number of hospitalizations, and bed days of care (Polisena et al.). However, the mixed results on the effects of telehealth in the literature suggest that more research is needed to isolate the specific factors that maximize the efficacy of telehealth interventions.

Access to Care

Telehealth has the potential to increase access to healthcare, particularly for those patients who are geographically isolated. For example, Alaskan telehealth programs are designed to increase access to care for rural residents including Alaska Natives. The telehealth infrastructure is relatively well developed, with the state's telehealth program connecting Alaska Native community village clinics, subregional clinics, multiphysician health centers, and hospitals (Innovations Exchange Team, 2013). The physicians interviewed reported the benefit of having time to complete more patient encounters with telehealth than when compared to in-person encounters (Innovations Exchange Team, 2013). A 2009 qualitative study of rural patients' perspectives on telehealth found that focus groups generally agreed that telehealth for the treatment of depression could be beneficial in that it may provide access to treatment options not otherwise available in their geographic region (Swinton et al.).

Healthcare costs are another factor that contribute to the accessibility of healthcare or the lack thereof. Chase et al. (2003) found telemonitoring to be cost effective for the patient, as the theoretical cost for the telehealth program was \$173.00 over the course of six months, while a single clinic visit cost an average of \$305 when accounting for the cost of the visit itself, transportation, food, childcare, and hotel stays. To match the amount of care the telehealth group was receiving, patients in the control group had clinic visits every 2 weeks, which would amount to an average of over \$3500 over the six-month study period. However, whether or not telehealth actually reduces costs to the patient is still a matter of debate. The research on telehealth for Alaska Natives revealed that since 2001 there was a 10% increase in travel for patients involved in primary care or specialty clinical telehealth consultations (Innovations Exchange Team, 2013). This has been attributed to the fact that telehealth is facilitating earlier detection of medical problems. Although there can be immediate associated costs to the patient, over time medical costs may be reduced because patients can avoid the more expensive treatments associated with later complications (Innovations Exchange Team, 2013). More in-depth and long-term cost-effectiveness analyses to both the patient and the healthcare system are needed to determine the economic implications of telehealth programs.

Patient Perceptions

Patient perceptions of telehealth are generally positive, although findings in the literature are mixed. For example, a 2012 qualitative study revealed that many patients have reservations about telehealth monitoring because they perceive it as a threat to their autonomy and ability to care for themselves (Sanders et al.). On the other hand, participants in a 2010 focus group study agreed unanimously that telehealth should be developed and thought that its expansion was inevitable (King et al., 2010). The group perceived that telehealth would give patients access to a wider range of services, would allow for more timely diagnosis and treatment, and would provide more effective monitoring for their health conditions). Multiple studies on patient perceptions have shown that telehealth monitoring helps patients feel more knowledgeable and empowered in managing their health conditions (King et al., 2010; Minatodani et al., 2013; Pare et al., 2007; Maudlin et al., 2006).

Many studies have also examined patient perspectives on the specific characteristics of telehealth programs that may contribute to their overall success. Focus group participants in the King et al. (2010) study emphasized that telehealth should be offered as a supplement to existing services rather than as a replacement for face-to-face interactions (King et al., 2010). One study that examined the use of telehealth to deliver nursing case management services to HIV/AIDS clients found that participants frequently expressed that they missed the physical presence of the nurse and the associated social interaction (Lillibridge and Hanna, 2009). One way of bridging this gap during telehealth videoconferencing is through the use of a second provider to act as an on-site facilitator, which may promote patient confidence and result in improved satisfaction with the quality of patient-provider communication (Agha et al., 2009; Swinton, Robinson, and Bischoff, 2009). However, it is worth noting that the need for additional staff with this method of telehealth delivery may hinder its cost effectiveness. Despite some concerns, patients who have used telehealth generally express satisfaction with the communication between themselves, their providers, and their nurses (Maudlin et al., 2006) and satisfaction with the provider's clinical competence and interpersonal skills (Agha et al., 2009).

Summary and Purpose

Although the current literature reveals some reservations on the use and implementation of telehealth, overall, existing studies document that telehealth is a promising direction to improve access to and outcomes of care for chronic health conditions such as diabetes. However, additional research is needed to better understand patients' perceptions on the strengths and weaknesses of current technology. Based on this knowledge, telehealth developers, policymakers, and HCPs can become more aware of how to overcome key barriers to use of telehealth and to reinforce the aspects of care that are currently effective.

The purpose of this thesis was to further explore patients' experiences, perspectives, and attitudes related to telehealth. A content analysis of themes from data collected from semi-structured interviews with 16 adults with type 2 diabetes mellitus (T2DM) was done to describe the nature of participants' personal experiences with and perceptions of telehealth. These data were collected from control group study participants who were enrolled within a larger intervention study of a decision support intervention (DSI) for promoting lifestyle behavior change for cardiovascular disease (CVD) risk factor reduction.

Theoretical Model

The theoretical framework guiding this research was based on a model of adherence to diabetes self-care published by Golin, DiMatteo, and Gelberg (1996). In this model, the extent to which the patient adheres to self-care activities recommended by their HCP is influenced directly and indirectly by a variety of factors, including patient participation in the medical encounter. Patient participation may promote a better understanding of the HCP's recommendations or a better fit of their self-care regimen within their lifestyle, which may indirectly improve adherence to diabetes care. On the other hand, patients may perceive omissions in opportunities for their participation in the medical encounter, which may indirectly hinder adherence to diabetes care.

The research for this thesis proposes that telehealth programs have the potential to increase adherence to diabetes self-care by acting at multiple points within the model. Telehealth may increase the patient's participation in the medical encounter, thereby encouraging an increased understanding of the HCP's recommendations, and of the fit of the self-care regimen within their lifestyle. Telehealth can improve the patient's sense of self-efficacy, which has a direct impact on the likelihood of adherence. Telehealth may also reinforce tangible enhancements in a variety of different ways. For example, a patient keeping track of their own carbohydrate intake with a mobile application ("app") may feel an increased sense of accomplishment and motivation by having access to a visual representation of their successes. Telehealth may also decrease tangible barriers to the patient's ability to comply with treatment. For example, tracking calories and carbohydrates can be a burdensome aspect of dietary management. However, certain mobile apps have features designed to make this quicker and easier than ever, such as a large database of common foods with nutrition information listed, and the ability to scan barcodes of common food products.

Although telehealth has the potential to increase adherence to diabetes self-care regimens by reinforcing patient participation, self-efficacy, and tangible enhancements while reducing tangible barriers, it may also have a neutral or paradoxical effect on these points in the model, thereby having no effect on or decreasing adherence. This may be due to a variety of factors including poorly designed telehealth programs, limited access to technology, or a patient's negative perceptions of telehealth. For example, a person with limited access to the internet may not benefit from patient-accessible electronic medical records. A person who has negative perceptions of telehealth is less likely to utilize telehealth services despite their potential benefits. This may have a neutral effect on adherence to diabetes self-care, or it may even decrease adherence if the patient perceives that the HCP's use of telehealth limits their ability to participate in the medical encounter. Because telehealth may have either a positive or negative impact on adherence to diabetes self-care, it is important to obtain patients' perspectives on which factors maximize and which factors limit the efficacy of these interventions.

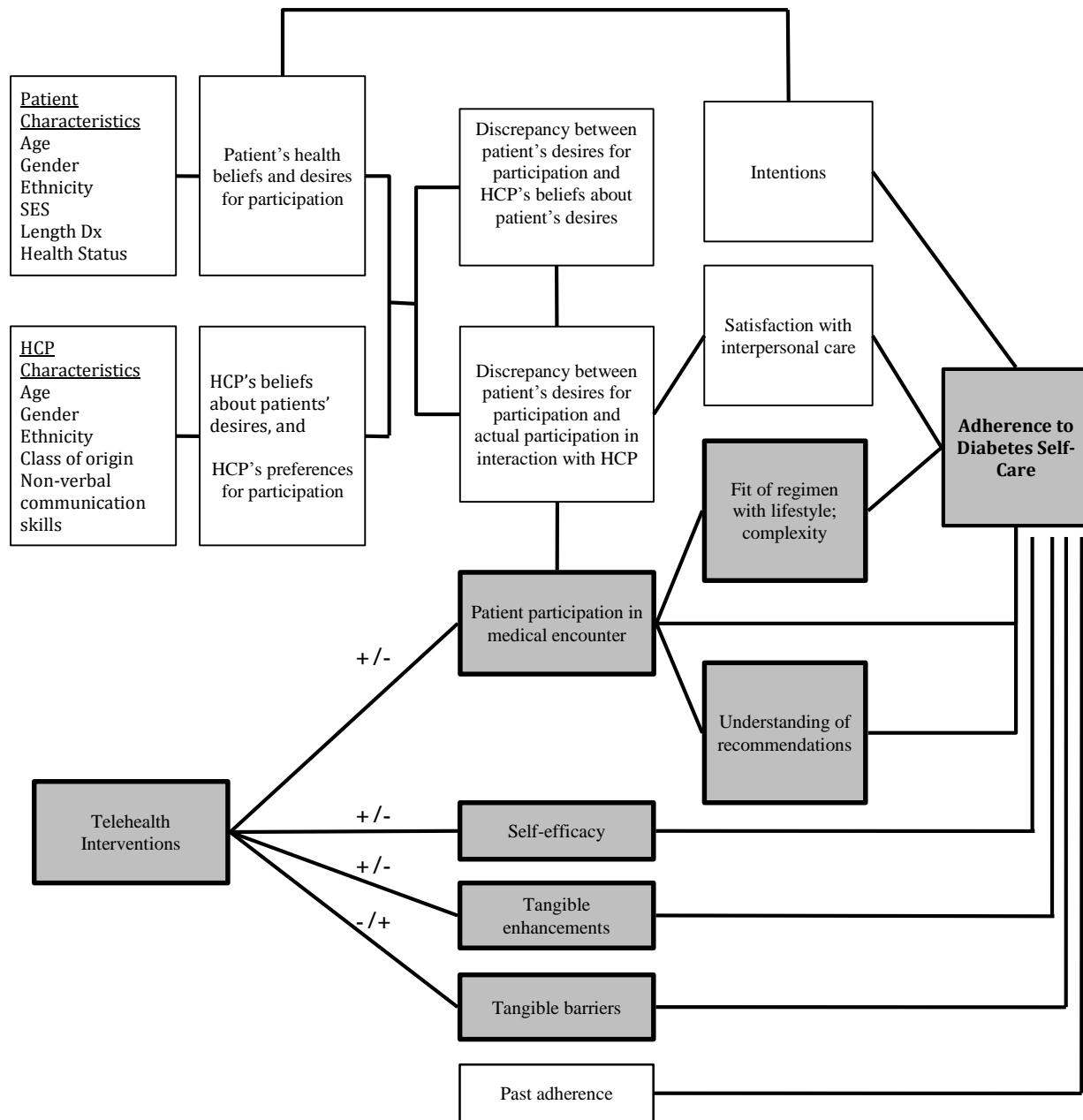


Figure 1—Adapted model of determinants of adherence to diabetes self-care, with those factors impacted by telehealth in shaded boxes. Based on Golin, DiMatteo, and Gelberg's 1996 research entitled "The Role of Patient Participation in the Doctor Visit."

Methods

Research Design

This thesis study was based on a thematic analysis of perceptions of telehealth among control group members in a larger intervention study of a decision support intervention (DSI) for promoting lifestyle behavior change for cardiovascular disease (CVD) risk factor reduction (Diabetes Health Promotion Study). The larger study examined a four-month behavior change intervention to support effective decision-making in adults with T2DM and at least one additional risk factor for CVD. Participants were screened and randomly assigned to either one of two intervention groups (n=40), which received eight biweekly coaching sessions over the phone to support decisions on behavior changes and diet and exercise goals, or the control group (n=20; 16 available for thesis analysis). Participants in the control group completed health system quality improvement interviews at the same frequency and duration as the intervention group, but without coaching. The data for this study comes from the week 2 interviews with control group participants regarding their perceptions of telehealth. Each interview lasted between 10 to 15 minutes, and participants were not probed or given advice or other coaching about personal health issues. Case notes to summarize the content of the conversation about telehealth were made for each of these calls, from which themes were extracted for analysis in this thesis.

Inclusion/Exclusion Criteria

Participants were eligible for the study if they were overweight or obese ($25 \leq \text{BMI} \leq 45$) adults within the ages of 40 to 75 years with T2DM, and with at least one other risk factor for CVD. These additional risk factors included hypertension, hyperlipidemia, hypertriglyceridemia, and high HbA1c. Participants with multiple health conditions and risk factors were appropriate for this thesis study because telehealth may be especially beneficial in the management of the chronic health conditions. Knowing more about these patients' perceptions may help HCPs and policymakers understand the current strengths and weaknesses of telehealth programs, and how they can be improved and more accessible.

Participants were screened in a two-stage process for the Diabetes Health Promotion Study. People who were not between the ages of 40 and 75 were excluded due to different health risk factors in these populations. Those who were not overweight or did not have at least one additional CVD risk factor were excluded. Pregnant women were excluded because of their different dietary needs and potentially different activity needs. Participants were screened with the Patient Health Questionnaire-8 (PHQ-8) to assess for depression. If the score was greater than 10, which reflected that they may have had at least a moderate level of depression, they were excluded from the study because this would require more extensive intervention to make dietary and physical activity changes than what the study could offer. Participants were also screened for their ability to perform physical activity using the Physical Activity Readiness Questionnaire (PAR-Q). Those participants who were unable to perform physical activity without consulting with their HCP were excluded from the study due to potential health safety risks.

Participants

The participants for this thesis study included 16 adults, ranging in age from 42 to 67 years, with T2DM and at least one CVD risk factor. Participants had T2DM for a widely-varying number of years, ranging from 1-20. The average HbA1c (7.6%) was slightly elevated at baseline upon study entry. Twelve participants were women and 4 were men, and 75% of the sample was white. The sample was relatively well-educated, with 7 participants having either a Bachelor's degree or an advanced degree, and 9 participants having their high school diploma/GED or some college. Sixty nine percent (n=11) of participants reported current telehealth use.

External and Internal Validity

By its nature, the primary study could not be blinded; both the researchers and participants were aware of whether they were in the intervention group or the control group, which may be a threat to internal validity. However, the randomization of participants into either the intervention or control group helps to minimize this threat. The sample group consisted of overweight or obese adults from Central Ohio between the ages of 40 and 75 with T2DM and at least one CVD risk factor, so results may be generalizable to similar populations. The small sample size of 16 participants limits the external validity, but this exploratory study was meant to serve as guidance for future research with larger sample sizes. Likewise, correlational statistics were used only on an exploratory basis to understand potential associations of variables to guide future research.

Measures

Semi-structured telephone interviews lasting between 10 and 15 minutes were performed with the control group on a biweekly basis. A general protocol was followed for each phone call, and included an opening explanation in which the topic was introduced and confidentiality was ensured, an overview of key information on the weekly topic and focused questions, and interview closure in which the researcher thanked the participant for their time and reminded them of the time and date of the next phone call. The general questions for the week 2 phone call were: "What do you think about this information?," "Does this information affect your life in any way? If so, how?," "Will you use this information we talked about in any way? If so, how?," and "Now that we've discussed this information, do you have any other thoughts you would like to share with me?"

Specific talking points for each week's topic were written into the protocol, which served to inform participants and initiate conversation. During week 2, basic information about what telehealth is and how it may be useful was provided verbally to each participant. The interviewer explained that telehealth includes methods of talking to a HCP without meeting in person, and examples were given, from videoconferencing with distant providers, to online electronic medicals records, to health-related mobile applications. The interviewer explained how telehealth could be specifically helpful to people with diabetes because it may allow the HCP to monitor health parameters such as blood glucose,

carbohydrate counts, insulin dosages, and physical activity between appointments. The interviewer explained other potential benefits of telehealth, such as the flexibility of asynchronous styles of telehealth communication and the ability to communicate with a HCP without having to travel long distances. Participants were asked if they had ever used telehealth and if so, what their perceptions of that experience were. No health advice or coaching was provided to participants during these telephone interviews.

Data Analysis

Case notes were written following each phone call to summarize each telehealth interview. Following the completion of all 16 phone calls, the narrative case notes were reviewed and coded with relevant keywords, allowing emerging themes to become apparent. Two independent coders coded each case note using a codebook that was drafted by the interviewer and refined in collaboration with a second research team member. Only a few discrepancies occurred in coding between coders, which were resolved by discussion. The coded data were analyzed descriptively using descriptive statistics and frequency distributions in the applicable contexts. Finally, the coded case note data were analyzed in relation to selected sociodemographic and clinical variables in order to explore associations between these factors and perspectives on telehealth. SPSS software (version 21) was used for data analysis. For correlational statistics, the Pearson r was used to calculate correlations between continuous variables, while point biserial r was used to calculate correlations between dichotomous variables. Chi-square tests were used to explore differences in proportions of categorical variables.

Results and Discussion

Types of Telehealth Used	n	% (of 16)
Electronic medical record	7	44%
Telephone/text message/email HCP	5	31%
None	5	31%
Internet information-seeking (ex: using search engines)	4	25%
Telephone check-in (HCP calls patient on established basis)	2	13%
Mobile apps	1	6%
Health-related email subscriptions	1	6%
Insurance company nurseline	1	6%
Medical equipment with telehealth capabilities	1	6%
Crisis management	1	6%

Purposes of telehealth use	n	% (of 16)
Education about health/condition	7	44%
Lab/test results	7	44%
Communication with HCP	6	38%
Doesn't use	5	31%
Medication Management	3	19%
Diabetes management/glycemic control	3	19%
Dietary management	3	19%
Exercise/physical activity	3	19%
Stress management	2	13%

Facilitators of Telehealth Use	n	% (of 16)
None	6	38%
Increased quality/frequency communication with HCP	6	38%
Increased knowledge about health or condition	5	31%
Ease/convenience	5	31%
Increased confidence in ability to manage health	4	25%
Financial incentive	1	6%

Barriers to Telehealth Use	n	% (of 16)
None mentioned	6	38%
Increases anxiety about health	3	19%
Perception of inadequate communication with HCP	3	19%
Unfamiliar with technology/too complicated	3	19%
Negative past experience	2	13%
Technology unavailable/inconvenient	2	13%
Lack of reason to use	1	6%

The four major topics that emerged with participants were the types of telehealth services they used, their reasons for using them, factors that facilitated use, and factors that were barriers to use. The most common themes mentioned in each category are illustrated in the tables above. A number of participants mentioned multiple types and purposes for telehealth services used. Some participants mentioned multiple facilitators or barriers, or mentioned both facilitators and barriers. The most common types of telehealth services participants mentioned using were electronic medical records ($n=7$) and contacting a HCP through phone, text messaging, or email ($n=7$). The most commonly cited reasons for using telehealth were to obtain health education ($n=7$), to view lab/diagnostic test results ($n=7$), and/or to communicate with their HCP ($n=6$). There was no clearly predominant factor mentioned that facilitated telehealth use, but the most often-mentioned factors were the feeling that it increased communication between patient and HCP ($n=6$), the perception that telehealth was easy-to-use or convenient ($n=5$), and the perception of increased knowledge about their health ($n=5$). A substantial proportion of participants did not mention any facilitators or barriers to use of telehealth ($n=6$, $n=6$). When barriers were mentioned, the three most endorsed barriers were that the technology was unfamiliar or unavailable ($n=5$), a perception of decreased quality of communication between patient and HCP ($n=3$), and increased anxiety about health brought about by using telehealth services ($n=3$). The sample size was too small to find any statistically significant relationships between these themes; however, the themes that did emerge still provide valuable insight into patients' perspectives on telehealth that should be considered and further explored in larger studies. Although the sample was too small to explore relationships between particular themes, it was possible to explore the frequency of themes mentioned under each topic. For example, a given participant could have mentioned 2 types of telehealth they use, 3 purposes behind the use, 4 facilitators, and 1 barrier.

Three statistically significant correlations were found when relationships between clinical characteristics and telehealth use variables were explored:

1. Time (years) since diagnosis with T2DM was correlated with higher HbA1C levels at baseline ($r=0.51$, $p=0.04$), indicating lower T2DM control with longer time since diagnosis,
2. Time (years) since diagnosis with T2DM was associated with a higher number of perceived facilitators of telehealth use ($r=0.58$, $p=0.02$), and
3. An increased number of reasons to use telehealth ($r=0.71$, $p=0.002$) and a higher number of perceived facilitators ($r=0.76$, $p=0.001$) were correlated with current telehealth use.

There are several implications for HCPs, telehealth developers, and future researchers based on these associations. In order for telehealth interventions to be effective, it is clear that HCPs need to understand what purposes, facilitators, and barriers to telehealth are relevant to their patients. Patients will not use these interventions unless they perceive a purpose and tangible benefits for doing so. HCPs, developers, and researchers should consider patients with complex, long-standing, or chronic medical conditions or those with multiple comorbidities as potential candidates for telehealth interventions. These patients may especially benefit from the extra support provided by

telehealth programs. Future studies should investigate the efficacy of telehealth interventions in particular chronic diseases. Directions for future research should also include the study of how characteristics of telehealth programs mediate patient perceptions, as well as how individual patient characteristics affect perceptions. The public is adapting telehealth interventions into their lifestyles at a rapid pace. It is important that these programs are effective and supported by research.

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